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SCIENTIFIC BOOKS

A Text-book of Biology for Students in General, Medical and Technical Courses. By WILLIAM MARTIN SMALLWOOD, Professor of Comparative Anatomy, Syracuse University. Philadelphia, Lea and Febiger. 1916. 317 pages, 261 engravings and 10 plates.

If a healthy interest in the method of teaching elementary zoology may be inferred from the number and variety of text-books appearing we may congratulate ourselves upon our present state. It is clear, however, from the varied character of the materials treated, that there is as yet no agreement regarding the matter which should enter into such a course. Since almost every phase of the subject has been presented, through methods of great diversity, it would seem possible that in time the experience of many teachers in widely different surroundings would point to the types of books best suited for elementary instruction. Judging by numbers, the present tendency would seem to be toward some very general treatment to which the term "biology" might be given. Some of these books have been long enough in service to have passed the first edition stage, and of these Smallwood's "Textbook of Biology" is one. This now appears in the "second edition, thoroughly revised and enlarged." A change in the title may be significant of an altered viewpoint of the author. In the first edition it is stated that the book is "for students in medical, technical and general courses" but in the present edition the last is made first and emphasis is placed on "general courses" by their early mention. Specific statement is also made of the importance of breadth of training in the preface, and, although this occurs in a reference to the purpose of the earlier edition, it is evident that the author has come to place additional value upon the underlying general principles of the subject. While he doubtless felt like "leaving their application to the teachers of advanced zoological, botanical and professional courses" at the time of writing the book, he is now strongly enough of the opinion to say so.

It is to be hoped that this is an indication of a general change in attitude toward too much of the "applied" in elementary biological instruction. That the author should be encouraged to announce his position more definitely on this point because of the formulated opinion of teachers of anatomy is very encouraging to all who believe in the value of thorough preparation in general subjects and who rightly feel they should have the support of those who teach the more specific and applied branches.

Such a conception of the relation of general to applied biology does not, however, signify to the author of the text that his subject-matter must be remote from experience or removed from practical interest, as is indicated by Chapter XV., which deals with "some biological factors in disease." Indeed, the length of this chapter in comparison with others—it exceeds the one devoted to "The Plant Kingdom"—and the details of disease symptoms recorded might incline a captious critic to question the emphasis claimed for broad principles. In this attitude he would be strengthened by the criterion adopted for an inclusion of a study of the Pelecypods in the book—this being that "clams and oysters are so generally used as food and so frequently cause disease" (p. 157). But the temptation to popularize our subjects is great, so it is not well, perhaps, to blame the author overmuch for occasional lapses toward the "practical."

There is now little chance in general texts to introduce anything new in the arrangement of the subjects, but Smallwood endeavors to add this touch by emphasizing the historical development of biology in the sequence of chapters. Since this represents the natural approach to the subject and follows the course of improvements in technique and instruments, it can not be far wrong practically. "The earlier chapters (I.–IX.) of this work, accordingly, take him (the student) through a consideration of the organism as a whole, the structure and function of organs, the structure and properties of tissues, and the parts of the cell and their work. The chapter devoted to the biology of cells furnishes the basis for the modern point of view and acts as a background for the remainder of the book." The topics of

these later chapters are "XI., Biology of Bacteria, Yeast and Moulds; XII., Classification—the 'Worms,' Mollusca and Arthropods; XIII., The Plant Kingdom; XIV., Some Biological Adaptations; XV., Some Biological Factors in Disease; XVI., Evolution; XVII., Variation-heredity; XVIII., Animal Behavior and Its Relation to Mind." From this outline it will be seen that the author maps out a very extensive program and it is not surprising that consideration of many topics is very brief, and, almost necessarily, inadequate many times. An account of "The Plant Kingdom" in 23 pages can not be very satisfying.

The style of the book is readable, but unfortunately is marred by many loose statements and faulty definitions. The cell is stated to be composed of the "nucleus" and "cytoplasm"—a structure and a substance, instead of nucleus and cytosome—structural subdivisions. Many examples of such definitions appear throughout the book. Physiology is defined as "the work that an organism does or the work of its parts"; metamorphosis as "a name given to the life-history of insects, frogs, etc."; symbiosis as "the living together of dissimilar plants or animals or a plant and an animal." The illustrations are good and are properly chosen to represent other forms than the ones used in the laboratory. No laboratory outlines are given and the brief and very general chapter headings, called "Laboratory Studies," would be of no service to a competent teacher and are far too general to help an untrained one. They could properly be omitted.

C. E. McCLUNG

SPECIAL ARTICLES

THE CAUSE OF THE DISAPPEARANCE OF CUMARIN, VANILLIN, PYRIDINE AND QUINOLINE IN THE SOIL

PRELIMINARY NOTE

CONSIDERABLE attention has been devoted recently to the fact that organic substances which are toxic to higher plants in water culture lose their toxicity when added to the soil.[1] This depends, however, on the soil.[2] This loss of toxicity would seem to be due to the fact that the substances, as such, disappear in the soil.[3] Funchess[4] has also found that many of the organic nitrogenous compounds toxic to plants in water culture are apparently nitrified in the soil. This would point to their disappearance as being due to biological causes. Some observations made by the writer during the past year on the cause of the disappearance of four of these compounds may prove suggestive to those who are investigating this problem.

Cumarin, vanillin, pyridine and quinoline were added separately at a concentration of 1,000 parts per million to soil in pots. This soil was similar to that used by Funchess,[5] in which the organic toxins were found to lose their toxicity or even become beneficial to plant growth. The number of microorganisms developing in the treated pots and in the check pots was determined at intervals over a period of about three months. In each case the numbers of microorganisms increased enormously in the treated pots, after, in some cases, an initial depression in numbers. The phenomenon appeared entirely analogous to that found in partial sterilization.

In order to determine whether microorganisms are concerned in the destruction of the substances named above, the compounds were added to sterile soil in two liter bottles. Part of each set of bottles, treated with one of the four substances mentioned above, was inoculated with an infusion from normal soil. The bottles were incubated about two months at room temperature. At the end of that time sterile wheat grains were planted in the bottles. The growth of the wheat plants showed that in the inoculated soil the toxic properties of the vanillin, cumarin, pyridine and quinoline had largely disappeared, but were still very evident in the bottles containing sterile soil. This seemed to indicate that

[1] Davidson, J., *Jour. Am. Soc. Agr.*, 7: 145–158, 221–238 (1915). Upson, F. W., and Powell, A. R., *Jour. Ind. and Engin. Chem.*, 7: 420–422 (1915). Fraps, G. S., Texas Ag. Ex. Sta. Bul., 174 (1915). Funchess, M. J., Alabama Ag. Ex. Sta. Tech. Bul., 1 (1916).

[2] Skinner, J. J., U. S. Dep't Agr. Bul. 164 (1915).

[3] Fraps, *loc. cit.*

[4] Unpublished data.

[5] *Loc. cit.*